Big Telescope Discs Made Here

Large telescope discs are being made in the United States as all mechanical difficulties have been overcome, according to an announcement made recently by Dr. George W. Morey, a member of the American Chemical Society.

This remarkable achievement is due to preparation and handling of the ingredients required for pure and flawless glass, and is the result of experiments begun at the outbreak of the world war, under the auspices of the Geophysical Laboratory of the Carnegie Institution in Washington.

Before 1914 practically all the optical glass in the United States was imported from Germany. When the United States entered the battle for democracy her army and navy used field glasses, range finders, telescopes and other instruments of precision, the lenses of which were fashioned beyond the Rhine. Private citizens even loaned or contributed opera glasses and binoculars to equip the fighting forces of the United States.

Optical glass of fine quality, however, is now to be had on this side of the water. The climax of this achievement of industrial chemistry has been reached by American makers in the manufacture of lenses for telescopes. At first discs which strengthened our view were made 3 or 4 inches in diameter. Recently a special 4¾ inch lens was ground for Lowell Observatory, at Flagstaff, Arizona.

The first 9½ inch disc was turned out December, 1919. Six others have since been made and delivered. As their diameters increase, discs are made with greater difficulty. Finally, on February 15, 1920, the first perfect 12 inch disc was furnished, and a large optical glass corporation now lists this size for short-time delivery.

The next size attempted was a 20 inch disc, in the manufacture of which the problem was still more complex. Several flawless ones were produced, but they cracked in the annealing process. American ingenuity was brought into play to devise a means of slowly cooling these immense plates of glass so that they might be free from that strain so likely to destroy them. Experiments by scientists of the Geophysical Laboratory showed exactly how slowly their temperatures must be lowered, and the cooling schedule outlined was closely followed. Owing, however, to the extreme cold weather of last March and the shortage of gas, this schedule could not be followed. One splendid disc strained and broke just when nearly ready to be taken from the oven.

Equipment hitherto used was then scrapped, and an electric furnace was specially designed to meet the needs of the problem by experts of an electric company (General Electric). This device is thoroughly insulated and provided with an automatic appliance which will hold the temperature absolutely constant to a fraction of a degree while the glass is being treated to remove strain. The temperature can be dropped a few degrees a week.

With the aid of this furnace now in process of construction, it is believed that the last difficulty in the way of the American manufacture of the largest discs will be overcome. Orders have already been accepted for the production of several large guaranteed discs, including one pair of the 18 inch size for refracting telescopes, and a 36 inch disc for a reflecting telescope. The furnace will receive the 40 inch size. When that goal has been reached, the company will continue the development, so that eventually the largest and finest discs in the world will be American made.

With such progress as this, chemists feel that American manufacturers of discs for astronomical telescopes, no matter how large such discs may be, have proved themselves capable of supplying American needs, and that this industry, therefore, is entitled to the full protection contemplated in Bill H. R. 7785, whose aim is the establishment and maintenance in the United States of the manufacture of laboratory glass ware, chemical porcelains, optical glass, and scientific and surgical instruments, thereby contributing to the chemical independence of the United States. This bill passed the House of Representatives by a decisive vote. It has received a favorable recommendation from the Senate Finance Committee, and will come befre the Senate at its next session.